

IN THE CLAIMS:

Please amend claims 36, 40 and 44-48; cancel claim 49; and add claims 53-63, as set forth below:

1-35. (Canceled)

36. (Currently Amended) A pFET synapse transistor, comprising:

a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

a p- doped substrate including:

a first n- well;

a first p+ doped region disposed in said first n- well forming a first source;

a second p+ doped region disposed in said first n- well forming a first drain, a number of electrons injected into the floating gate increased ~~responsive to increase in when~~ a voltage difference between the first source and the first drain is increased; and

a channel disposed in said first n- well between said source and said drain;

a first layer of gate oxide above said channel and said first n- well; and

a first polysilicon floating gate disposed above said layer of gate oxide; and

a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second

drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;
a second layer of gate oxide above said first n- well;
a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate; and
a conductor connecting the second drain and the second source, wherein a number of electrons removed from the second polysilicon floating gate is increased when increase responsive to increase in voltage at the second drain or the second source is increased, wherein the conductor comprises a conductive layer which forms a bridge over said second polysilicon floating gate.

37-38. (Canceled)

39. (Previously Presented) The pFET synapse transistor in accordance with claim 36, wherein said readout transistor and the shorted transistor include a single layer of conductive polysilicon.

40. (Currently amended) The pFET synapse transistor in accordance with claim 36, wherein the pFET synapse transistor is fabricated using a standard CMOS process.

41-43. (Canceled)

44. (Currently Amended) A pFET synapse transistor, comprising:
a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

a p- doped substrate including:
a first n- well;

a first p+ doped region disposed in said first n- well forming a first source;

a second p+ doped region disposed in said first n- well forming a first drain, a number of electrons injected into the floating gate increased ~~responsive to increase in~~ when a voltage difference between the first source and the first drain is increased; and

a channel disposed in said first n- well between said source and said drain;

a first layer of gate oxide above said channel and said first n- well; and

a first polysilicon floating gate disposed above said layer of gate oxide; and

a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;

a second layer of gate oxide above said first n- well;

a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate;

a conductor connecting the second drain and the second source, wherein a number of electrons removed from the second polysilicon floating gate is increased ~~responsive to increase in~~ when voltage at the second drain or the second source is

increased, wherein the conductor comprises a conductive layer which forms a bridge over said second polysilicon floating gate; and

a well contact terminal electrically coupled to said second n- well, wherein said synapse transistor is configured to operate as a current source without gate input using a single polysilicon gate layer.

45. (Currently Amended) A system on a chip (SOC) including digital and analog circuits integrated on a single semiconductor chip, the system comprising:

a pFET synapse transistor including:

a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

a p- doped substrate including [[:]];.

a first n- well;

a first p+ doped region disposed in said first n- well forming a first source;

a second p+ doped region disposed in said first n- well forming a first drain, a number of electrons injected into the floating gate increased responsive to increase in when a voltage difference between the first source and the first drain is

increased; and

a channel disposed in said first n- well between said source and said drain;

a first layer of gate oxide above said channel and said first n- well; and

a first polysilicon floating gate disposed above said layer of gate oxide; and

a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;

a second layer of gate oxide above said first n- well;

a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate; and

a conductor connecting the second drain and the second source, wherein a number of electrons removed from the second polysilicon floating gate is increased responsive to increase in when voltage at the second drain or the second source is increased.

46. (Currently Amended) A p-channel floating-gate device connected to a digital-to-analog converter, comprising:

a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

a p- doped substrate including:

a first n- well;

a first p+ doped region disposed in said first n- well forming a first source;

a second p+ doped region disposed in said first n- well forming a first drain, a number of electrons injected into the floating gate increased ~~responsive to increase in~~ when a voltage difference between the first source and the first drain is increased; and

a channel disposed in said first n- well between said source and said drain;

a first layer of gate oxide above said channel and said first n- well; and

a first polysilicon floating gate disposed above said layer of gate oxide; and

a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;

a second layer of gate oxide above said first n- well;

a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate; and

a conductor connecting the second drain and the second source, a number of electrons removed from the second polysilicon floating gate is increased responsive to increase in when voltage at the second drain or the second source is increased.

47. (Currently Amended) A system on a chip (SOC) including digital and analog circuits integrated on a single semiconductor chip, the system comprising:

 a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

 a p- doped substrate including:

 a first n- well;

 a first p+ doped region disposed in said first n- well forming a first source;

 a second p+ doped region disposed in said first n- well

 forming a first drain, a number of electrons injected into the floating gate increased responsive to increase in when a voltage difference between the first source and the first drain is increased; and

 a channel disposed in said first n- well between said source and said drain;

 a first layer of gate oxide above said channel and said first n- well; and

 a first polysilicon floating gate disposed above said layer of gate oxide; and

 a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

 a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;

 a second layer of gate oxide above said first n- well;

a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate; and a conductor connecting the second drain and the second source, wherein a number of electrons removed from the second polysilicon floating gate is increased responsive to increase in when voltage at the second drain or the second source is increased.

48. (Currently Amended) A p-channel floating gate device comprising:
a readout transistor for injecting electrons into a floating gate, the readout transistor comprising:

a p- doped substrate including:
a first n- well;
a first p+ doped region disposed in said first n- well forming a first source;
a second p+ doped region disposed in said first n- well forming a first drain, a number of electrons injected into the floating gate is increased when increased responsive to increase in a voltage difference between the first source and the first drain is increased; and a channel disposed in said first n- well between said source and said drain;
a first layer of gate oxide above said channel and said first n- well; and a first polysilicon floating gate disposed above said layer of gate oxide; and a shorted transistor for removing electrons from the floating gate, the shorted transistor comprising:

a p- doped substrate including a second n-well, a second drain within the second n-well, and a second source within the second n-well, wherein the second drain comprises a third p+ doped region within the second n-well, and the second source comprises a fourth p+ doped region;

a second layer of gate oxide above said first n- well;

a second polysilicon floating gate above said second layer of gate oxide, the second polysilicon floating gate connected to the first polysilicon floating gate; and

a conductor connecting the second drain and the second source, wherein a number of electrons removed from the second polysilicon floating gate is increased responsive to increase in when voltage at the second drain or the second source is increased.

49-50. (Canceled)

51. (Previously Presented) The p-channel floating gate device in accordance with claim 48, wherein said readout transistor and the shorted transistor include a single layer of conductive polysilicon.

52. (Previously Presented) The p-channel floating gate device in accordance with claim 48, wherein the floating gate device is fabricated using a standard CMOS process.

53. (New) The pFET synapse transistor in accordance with claim 36, wherein the pFET synapse transistor is configured to trim a current source in a digital-to-analog (DAC) converter.

54. (New) The pFET synapse transistor in accordance with claim 44, wherein the pFET synapse transistor is configured to trim a current source in a digital-to-analog (DAC) converter.

55. (New) The pFET synapse transistor in accordance with claim 44, wherein said readout transistor and the shorted transistor include a single layer of conductive polysilicon.

56. (New) The pFET synapse transistor in accordance with claim 44, wherein the pFET synapse transistor is fabricated using a standard CMOS process.

58. (New) The SOC in accordance with claim 45, wherein the pFET synapse transistor is configured to trim a current source in a digital-to-analog (DAC) converter.

59. (New) The SOC in accordance with claim 45, wherein said readout transistor and the shorted transistor include a single layer of conductive polysilicon.

60. (New) The SOC in accordance with claim 45, wherein the SOC is fabricated using a standard CMOS process.

61. (New) The p-channel floating-gate device in accordance with claim 46, wherein the p-channel floating-gate device is configured trim a current source in a digital-to-analog (DAC) converter.

62. (New) The p-channel floating-gate device in accordance with claim 48, wherein the p-channel floating-gate device is configured trim a current source in a digital-to-analog (DAC) converter.

63. (New) The p-channel floating-gate device in accordance with claim 48, wherein the p-channel floating-gate device is fabricated using a standard CMOS process.